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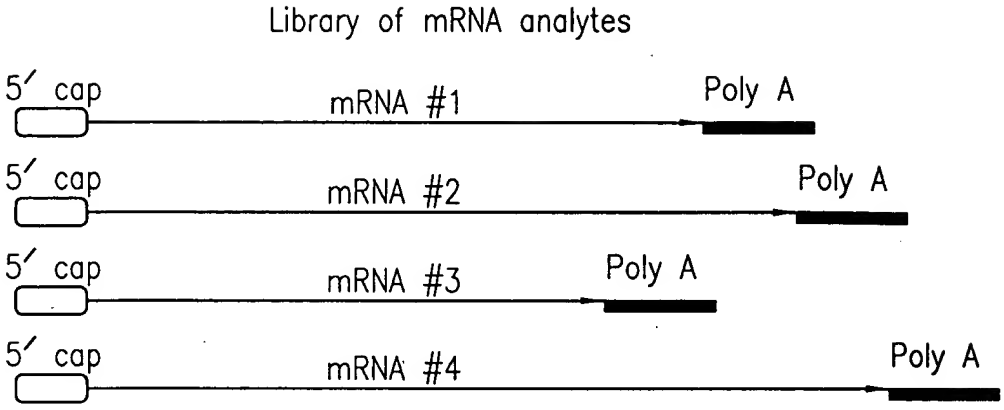

Library of mRNA analytes
5′ cap
mRNA #1
Poly A
5′ cap
mRNA #2
Poly A
5′ cap
mRNA #3
Poly A
5′ cap
mRNA #4
Poly A

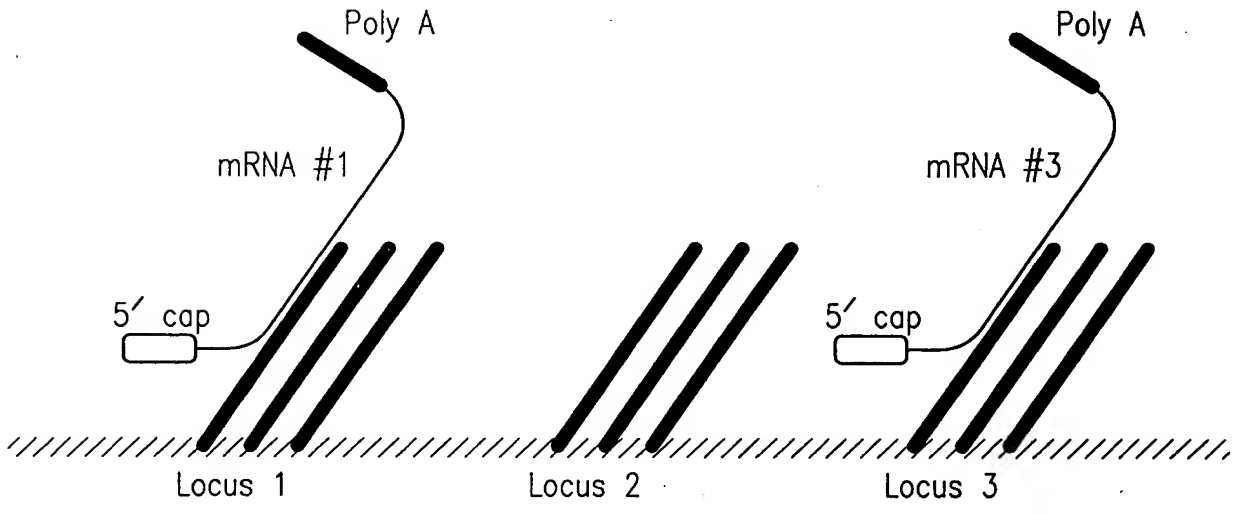

Library of mRNA analytes bound to an array
Poly A
mRNA #1
5′ cap
Poly A
mRNA #3
5′ cap
Locus 1
Locus 2
Locus 3

FIG. 1

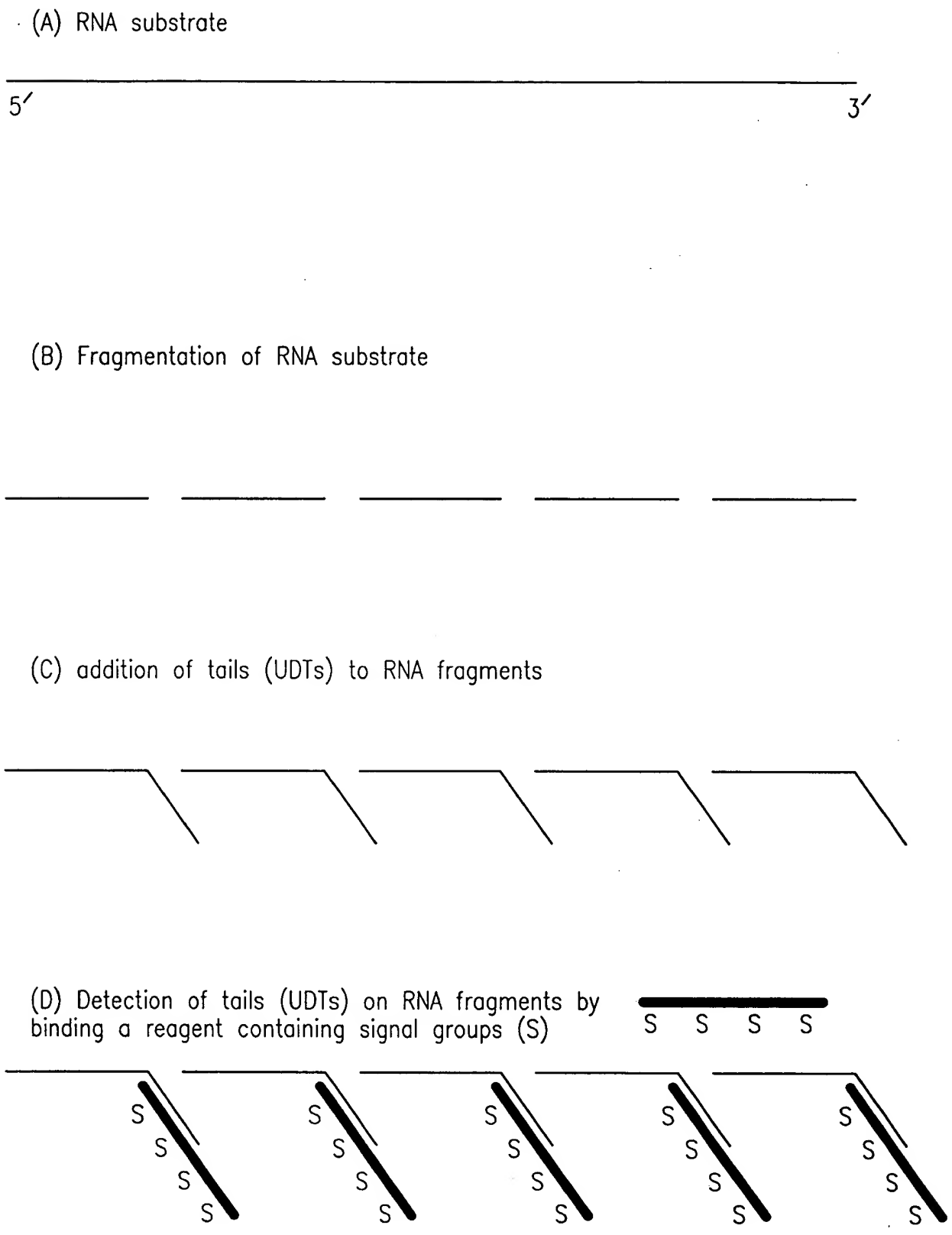
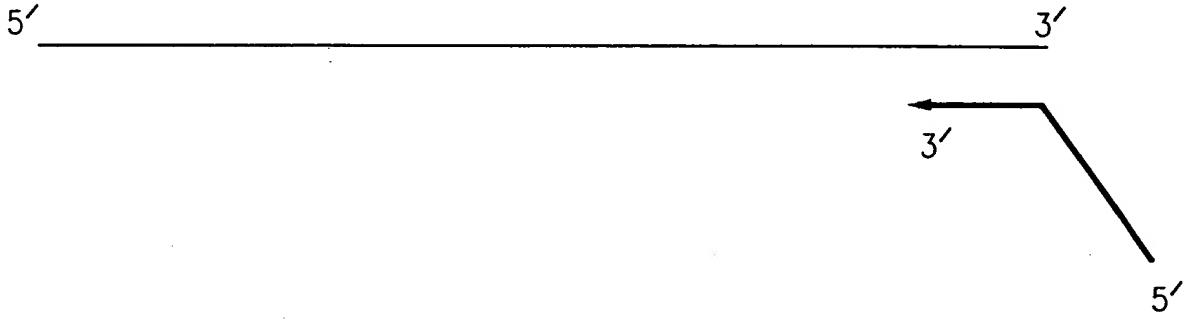

(A) RNA substrate
5′
3′
(B) Fragmentation of RNA substrate
(C) addition of tails (UDTs) to RNA fragments
(D) Detection of tails (UDTs) on RNA fragments by binding a reagent containing signal groups (S)
S S S S
S S S S
S S S S
S S S S
S S S S
S S S S

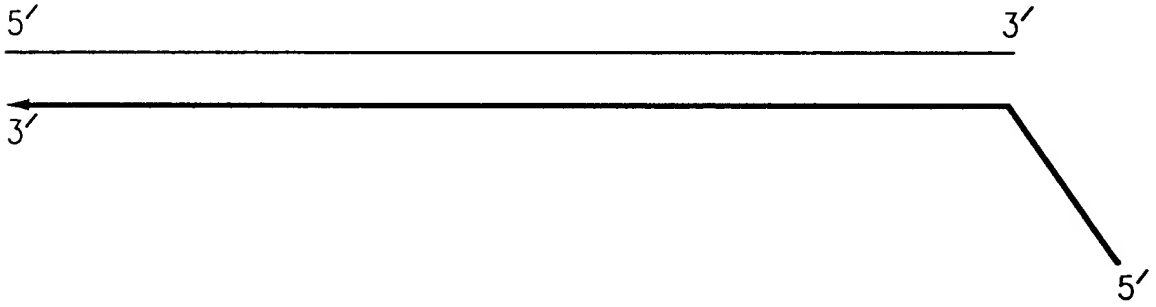
FIG. 2

(A) RNA Substrate

(B) Binding of Primer to RNA Substrate



(C) Extension of Primer using RNA as template



(D) Template Independent Extension of Primer

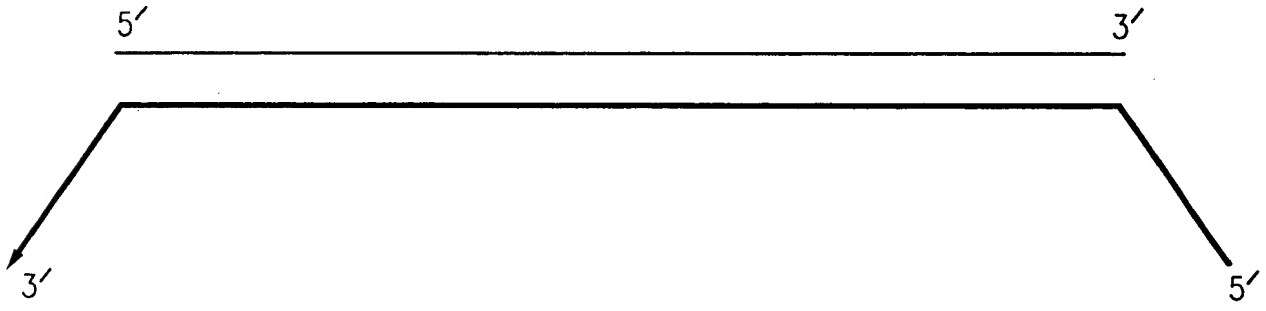
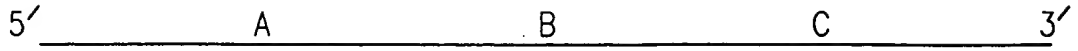
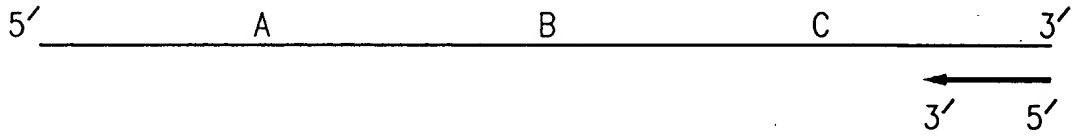


FIG. 3

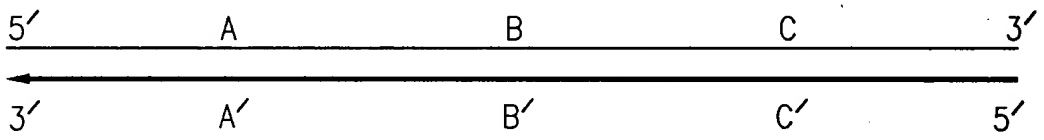
(A) RNA substrate



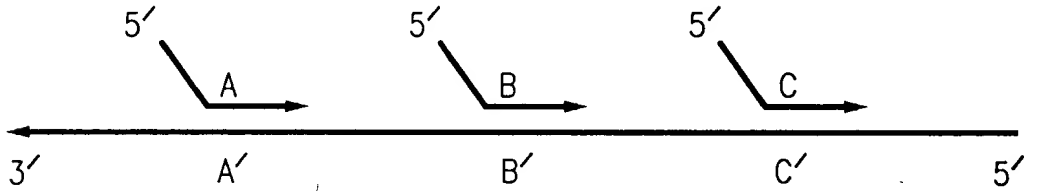
(B) Binding of Primer to RNA Substrate



(C) Extension of Primer using RNA as template



(D) Binding of random primers to 1st cDNA strand



(E) Extension and strand displacement of random primers

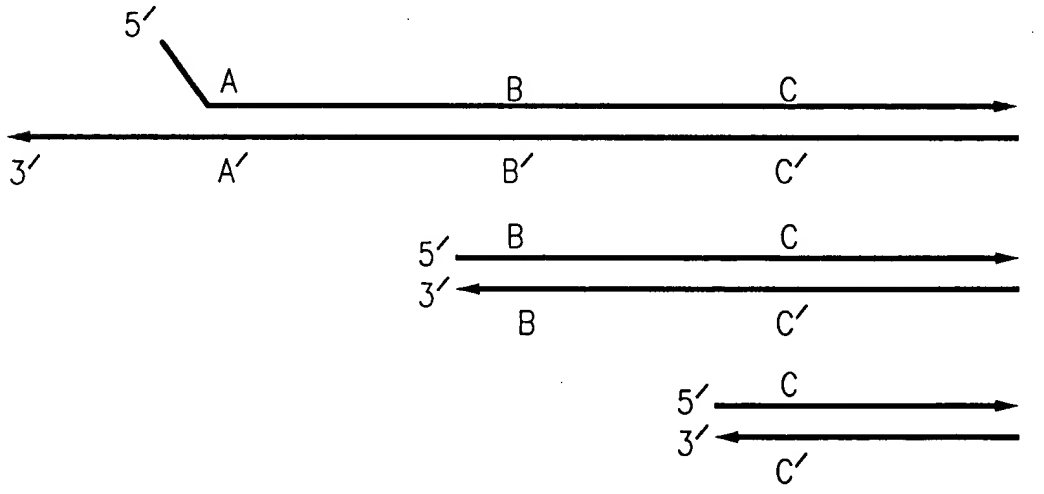
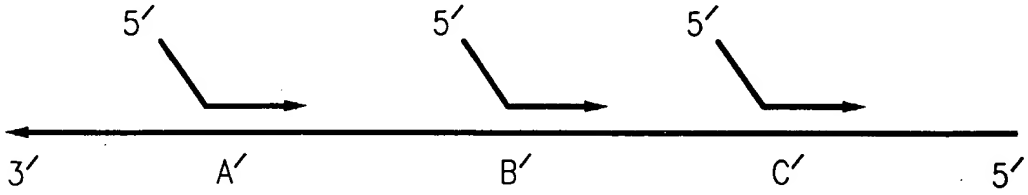
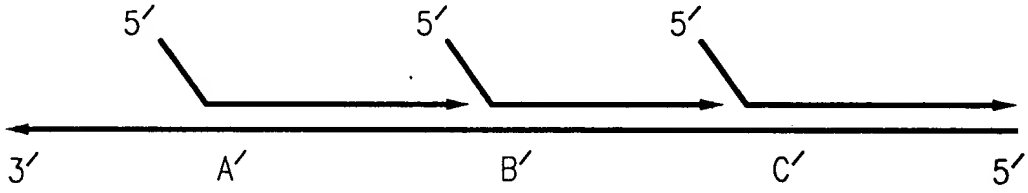


FIG. 4

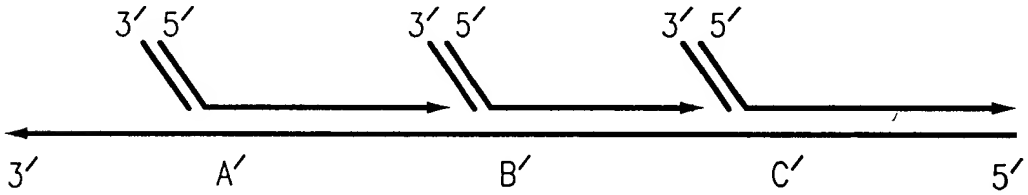
(1) Binding of random primers to 1st cDNA strand



(2) Extension of random primers using 1st cDNA strand as template



(3a) Creation of functional promoters by binding of complementary strand



(3a) Creation of functional promoters by self-complementary sequences

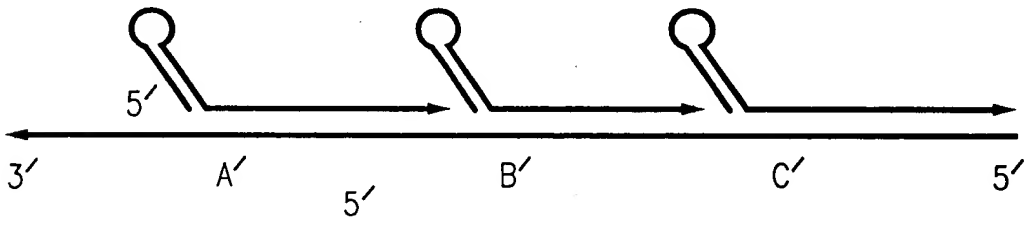
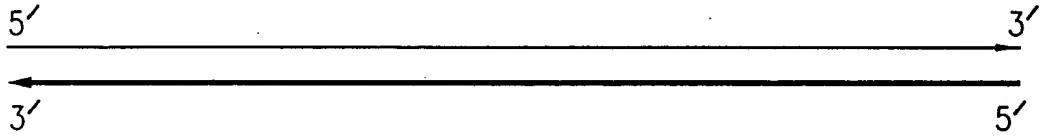


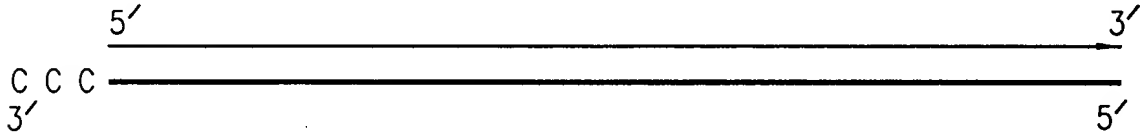
FIG. 5

(A) Binding of Primer to analyte

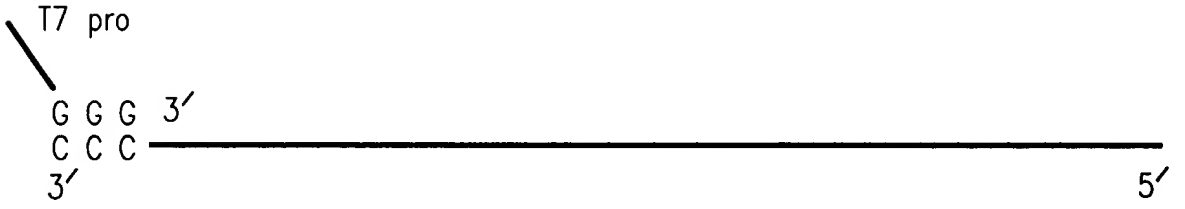
(B) Extension of Primer using analyte as template



(C) Template Independent addition of dCTP



(D) Use of 3′ end of 1st cNA strand for binding of Primer with T7 promoter



(E) Binding of Primer with T7 promoter to internal sequenced of cNDNA

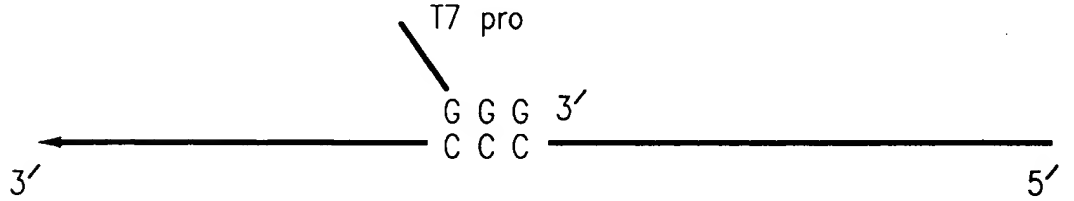
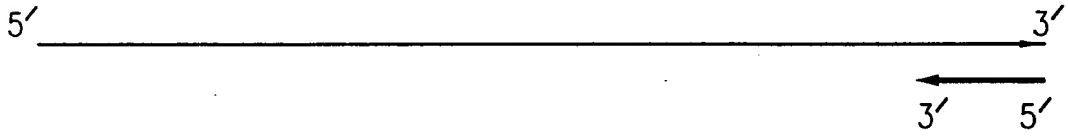


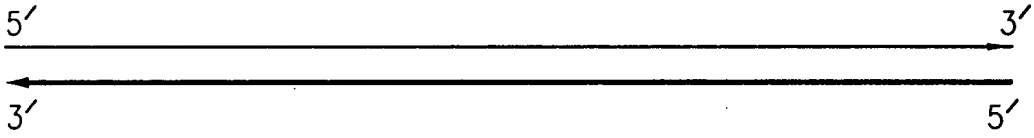
FIG. 6

(A) RNA Substrate

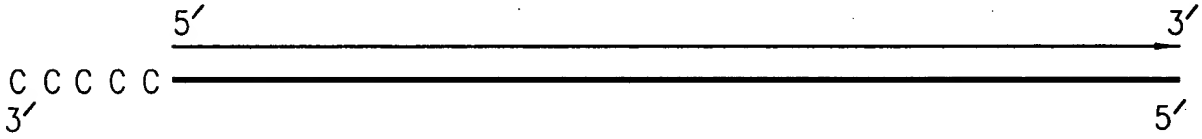
(B) Binding of Primer to RNA substrate



(C) Extension of Primer using RNA as template



(D) Template Independent addition of dCTP by Terminal Transferase



(E) Use of 3′ end of 1st cDNA strand for binding of Primer with T7 promoter

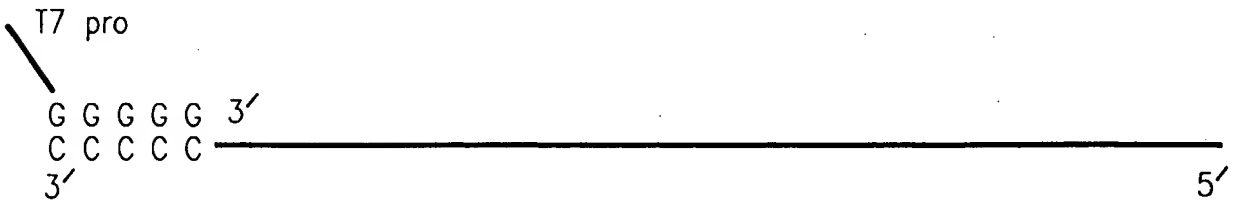
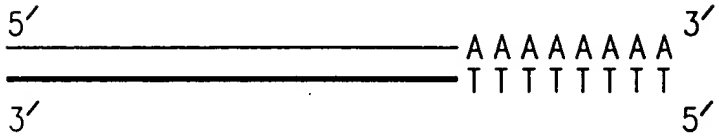


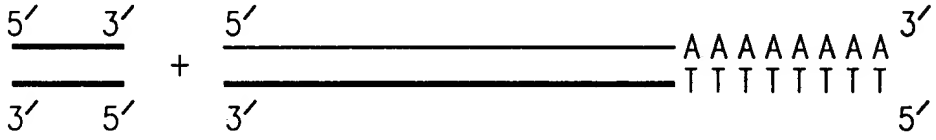
FIG. 7

1) analyte

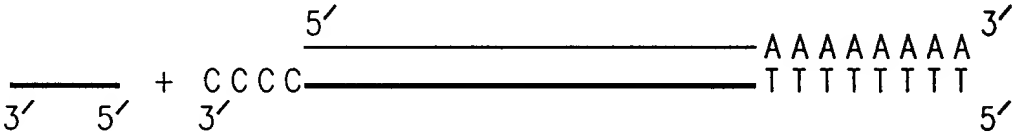
2) cNA copy made from analyte



3a)double-stranded oligonucleotide ligated to RNA/DNA hybrid by T4 DNA ligase



3b)single-stranded oligonucleotide ligated to a single-stranded 3′ tail by T4 RNA ligase



3c)double-stranded oligonucleotide ligated to single-stranded 3′ tail by T4 DNA ligase

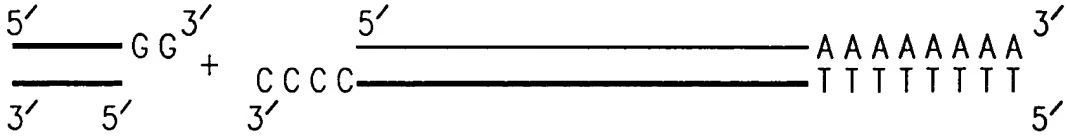
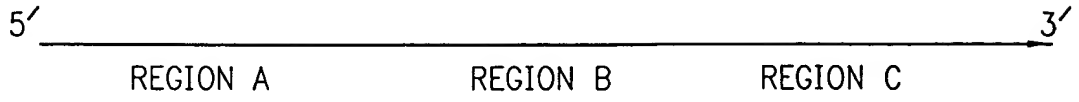
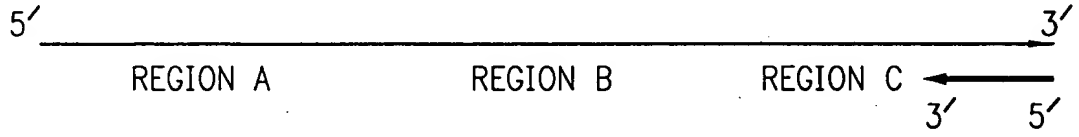


FIG. 8

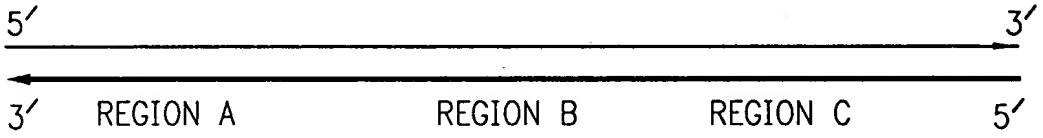
(A) RNA Substrate



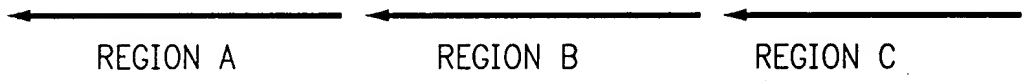
(B) Binding of Primer to RNA Substrate



(C) Extension of Primer using RNA as template



(D) Nicking of cDNA strand followed by release from RNA template



(E) Template independent addition of dCTP and binding of primer with T7 Promoter

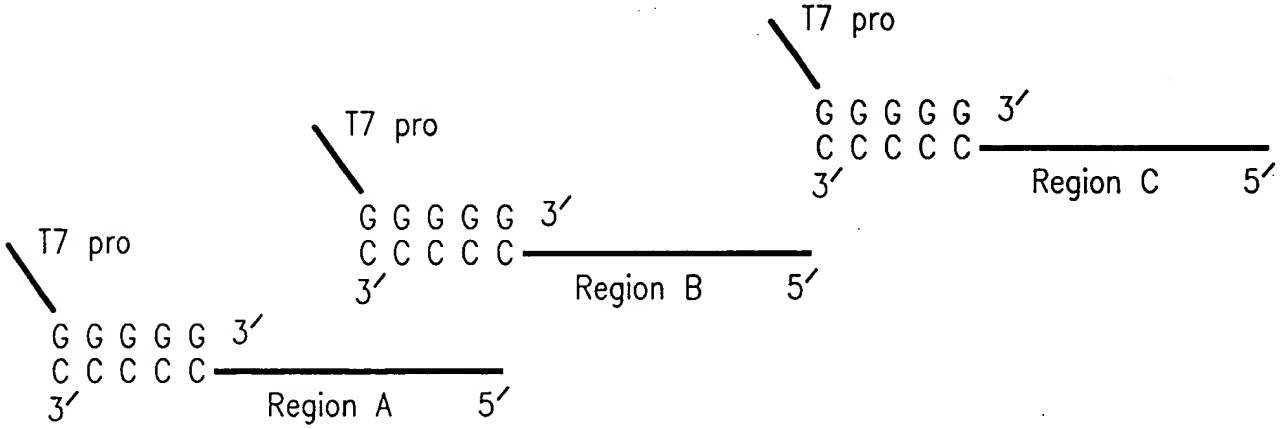
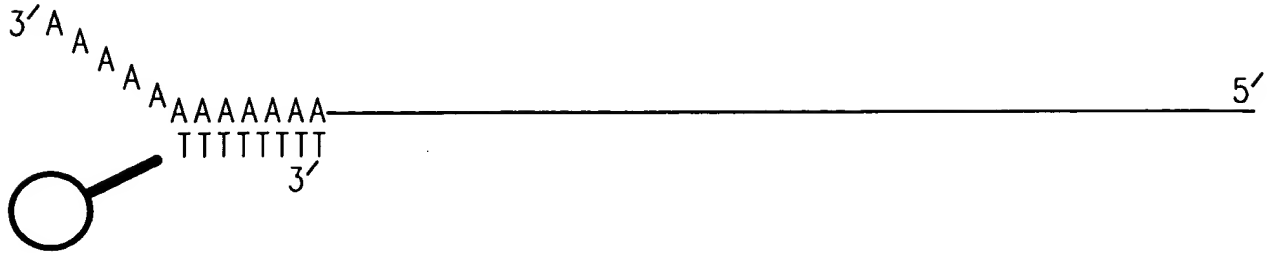
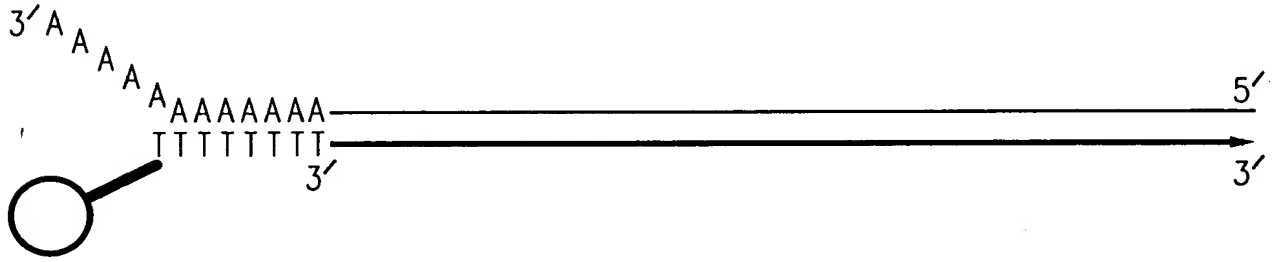


FIG. 9

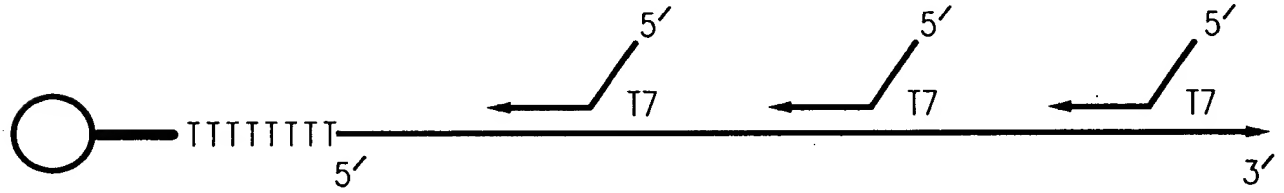
(A) Capture of poly A mRNA with oligo–T beads



(B) Extension of Oligo T with poly A mRNA as template



(C) Removal of poly A mRNA and binding of random primers with T7 promoter sequence



(D) Extension of primers and strand displacement of extended primers

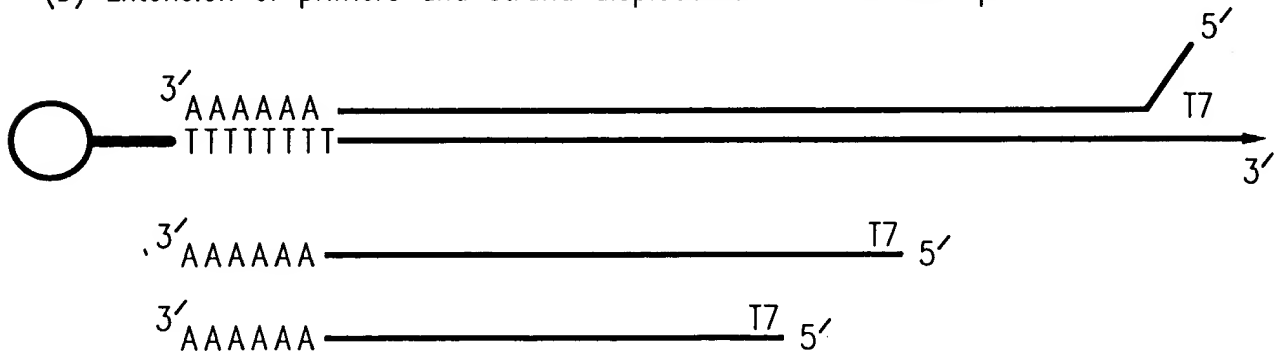
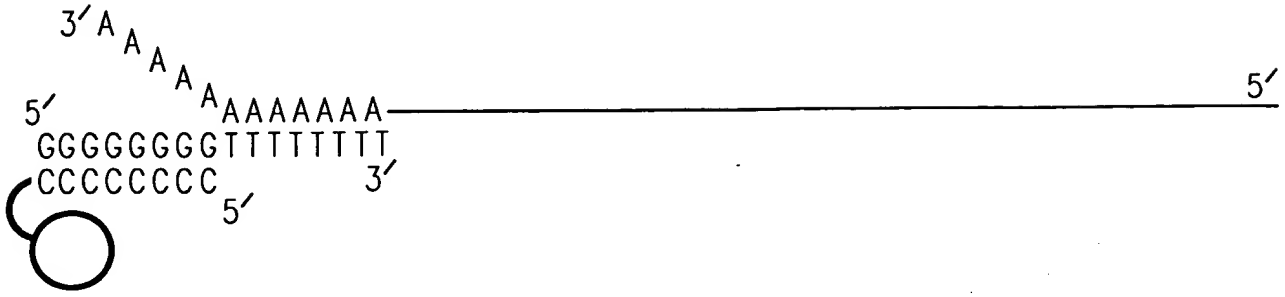
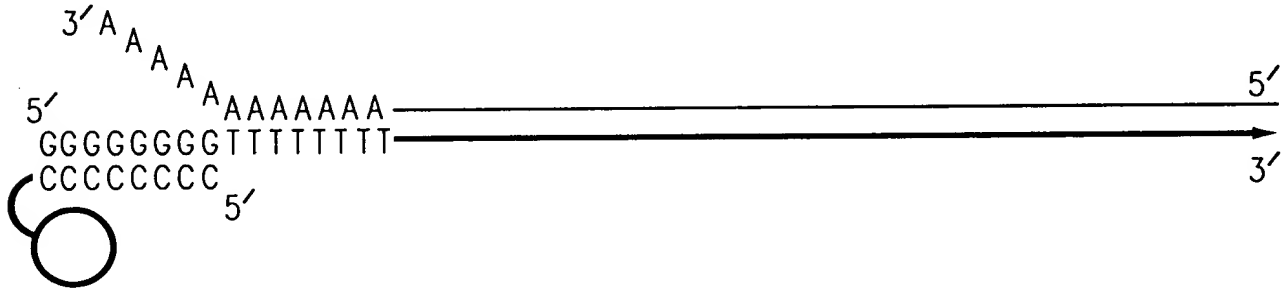


FIG. 10

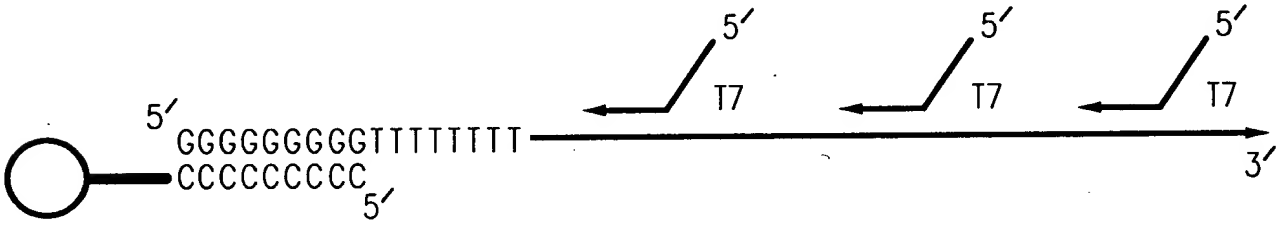
(A) Sandwich Capture of poly A mRNA



(B) Extension of Oligo T with poly A mRNA as template



(C) Removal of poly A mRNA and binding of random primers with T7 promoter sequence



(D) Extension of primers and strand displacement of extended primers

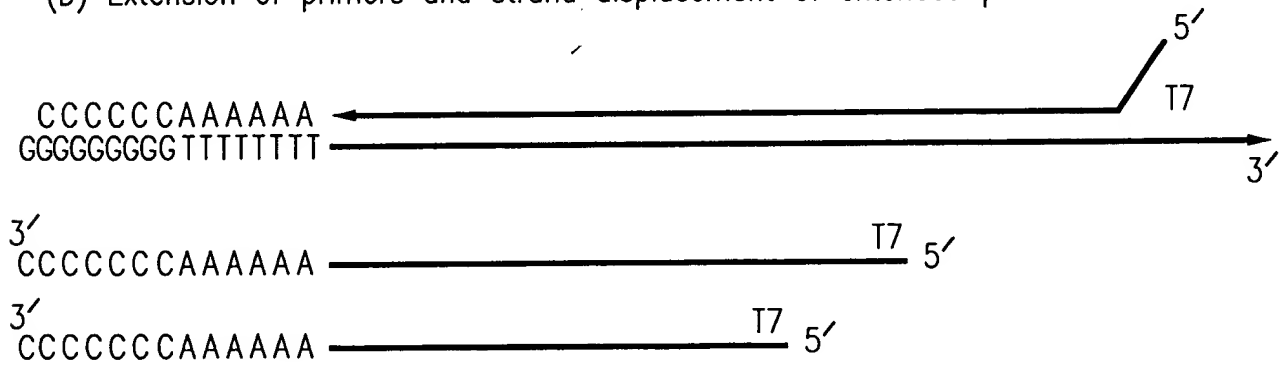
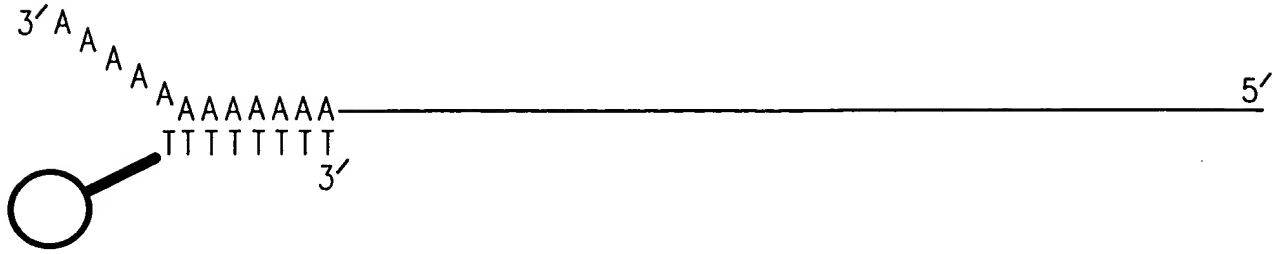
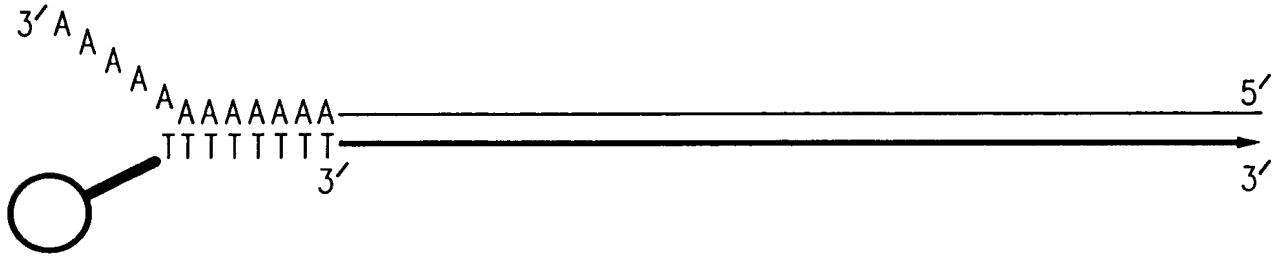


FIG. 11

(A) Capture of poly A mRNA with oligo–T beads

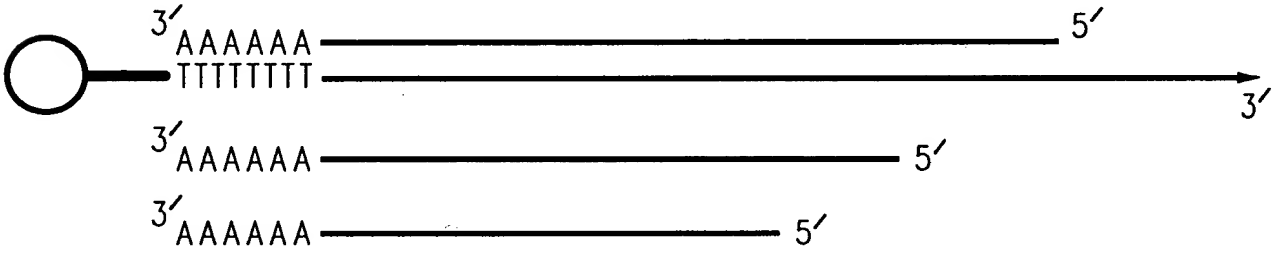


(B) Extension of Oligo T with poly A mRNA as template



(C) Removal of poly A mRNA and binding of random primers to 1st cDNA strand

(D) Extension of random primers and strand displacement of extended primers



(E) Hybridization of oligo–T/T7 Pro primers to 2nd cDNA strands

(F) Extension of oligo–T/T7 Pro primers and 2nd cDNA strands

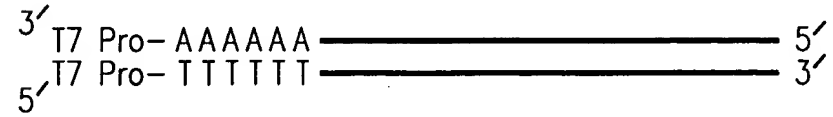


FIG. 12

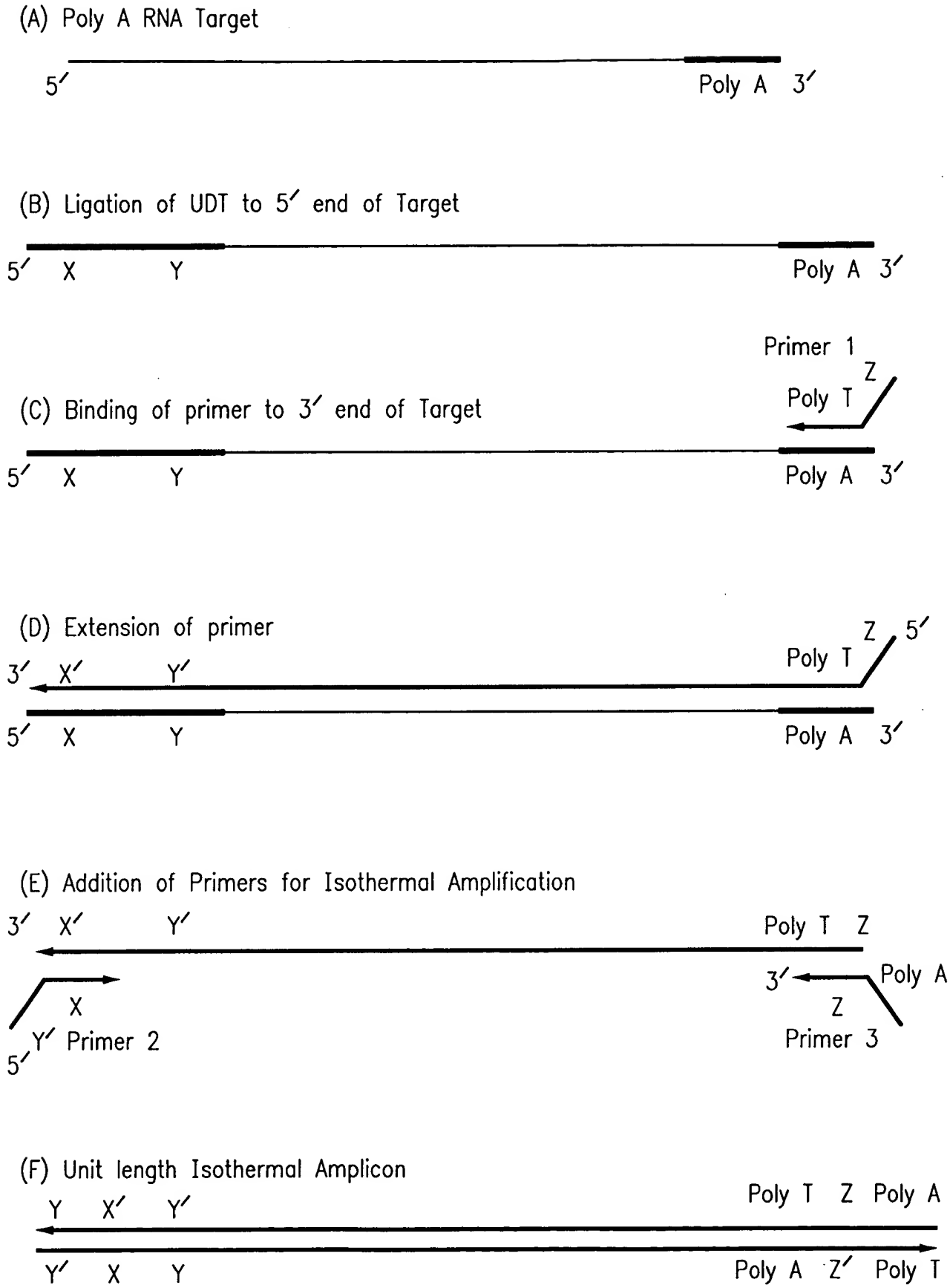
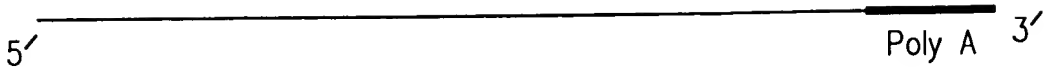
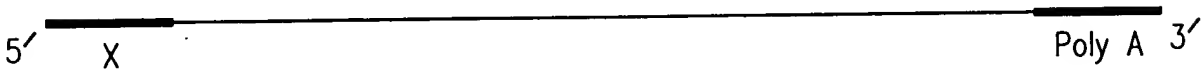

(A) Poly A RNA Target
5′
Poly A 3′
(B) Ligation of UDT to 5′ end of Target
5′ X Y
Poly A 3′
Primer 1
Z
Poly T
(C) Binding of primer to 3′ end of Target
5′ X Y
Poly A 3′
(D) Extension of primer
Z 5′
Poly T
3′ X′ Y′
5′ X Y
Poly A 3′
(E) Addition of Primers for Isothermal Amplification
3′ X′ Y′
Poly T Z
3′
Poly A
X
Z
Y′ Primer 2
5′
Primer 3
(F) Unit length Isothermal Amplicon
Y X′ Y′
Poly T Z Poly A
Y′ X Y
Poly A Z′ Poly T

FIG. 13

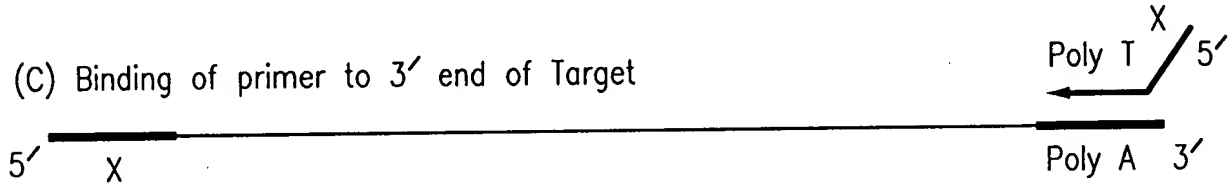
(A) Poly A RNA Target



(B) Ligation of UDT to 5′ end of Target

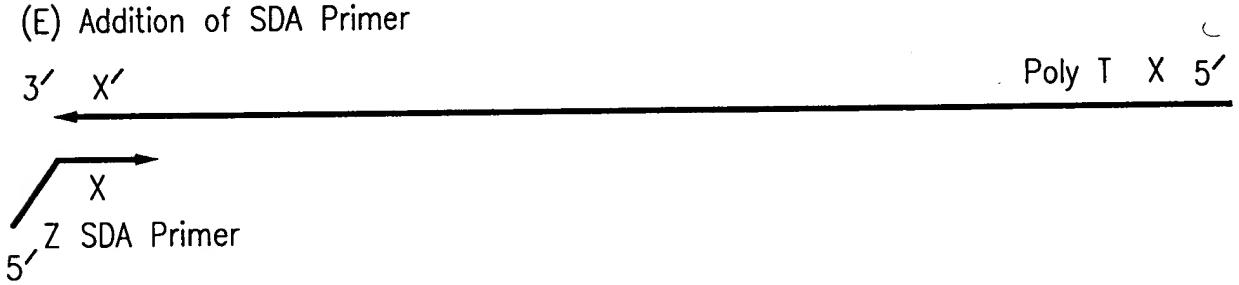


(C) Binding of primer to 3′ end of Target



(D) Extension of primer

(E) Addition of SDA Primer



(F) Unit length SDA Amplicon

FIG. 14

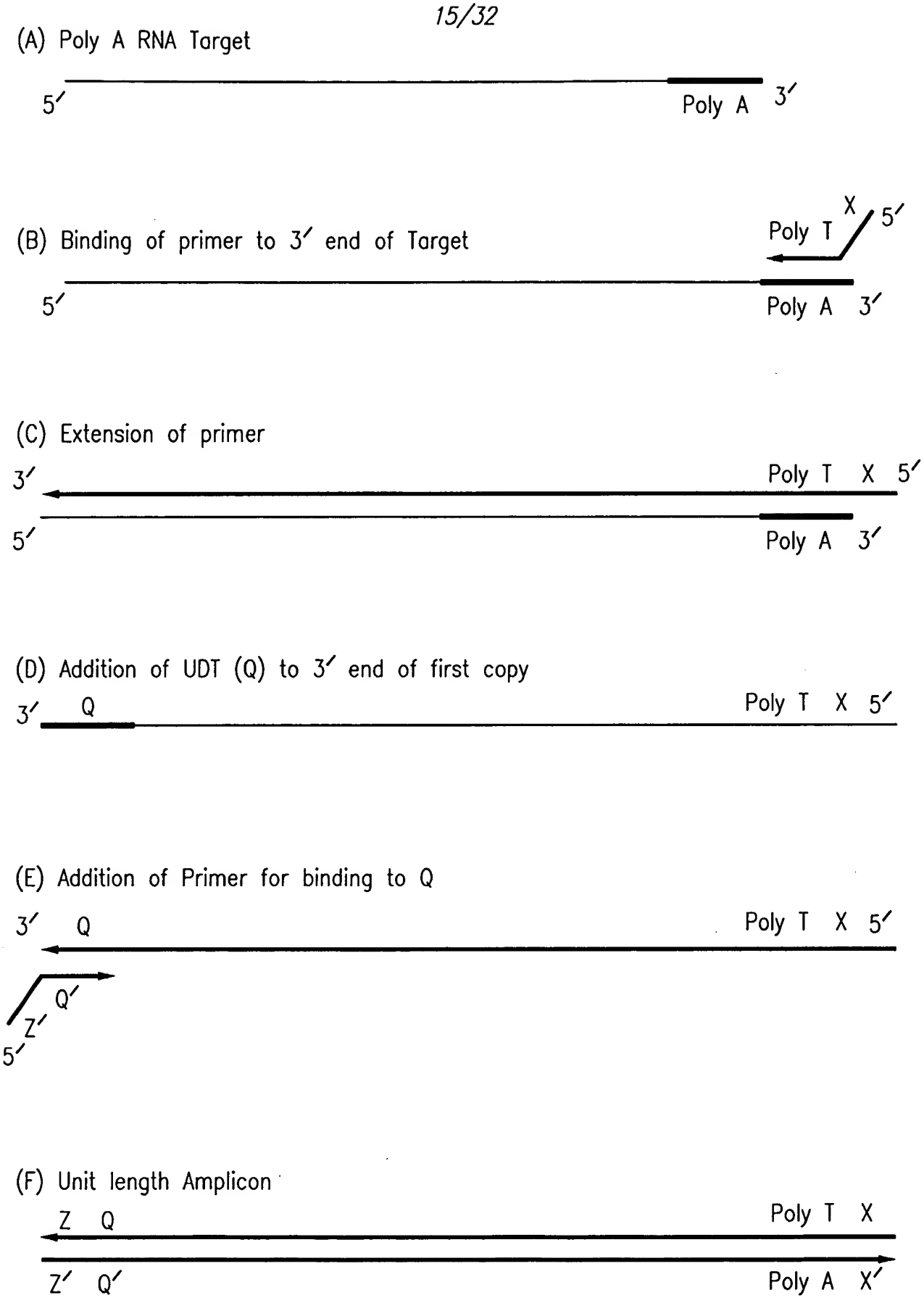
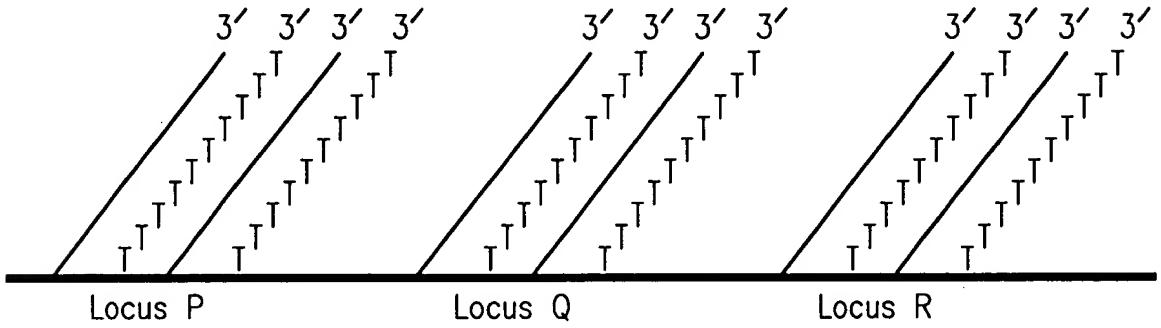

(A) Poly A RNA Target
5′
Poly A
3′
(B) Binding of primer to 3′ end of Target
X
Poly T
5′
5′
Poly A
3′
(C) Extension of primer
3′
Poly T X 5′
5′
Poly A
3′
(D) Addition of UDT (Q) to 3′ end of first copy
3′
Q
Poly T X 5′
(E) Addition of Primer for binding to Q
3′
Q
Poly T X 5′
Q′
Z′
5′
(F) Unit length Amplicon
Z Q
Poly T X
Z′ Q′
Poly A X′

FIG. 15

(1) Array with SPE's complementary to analyte "P" at Locus P, SPE's complementary to analyte "Q" at Locus Q and SPE's complementary to analyte "R" at Locus R and with UPE's comprising Poly T sequences at all three loci



(2) Binding of analyte "P" to corresponding SPE at Locus P

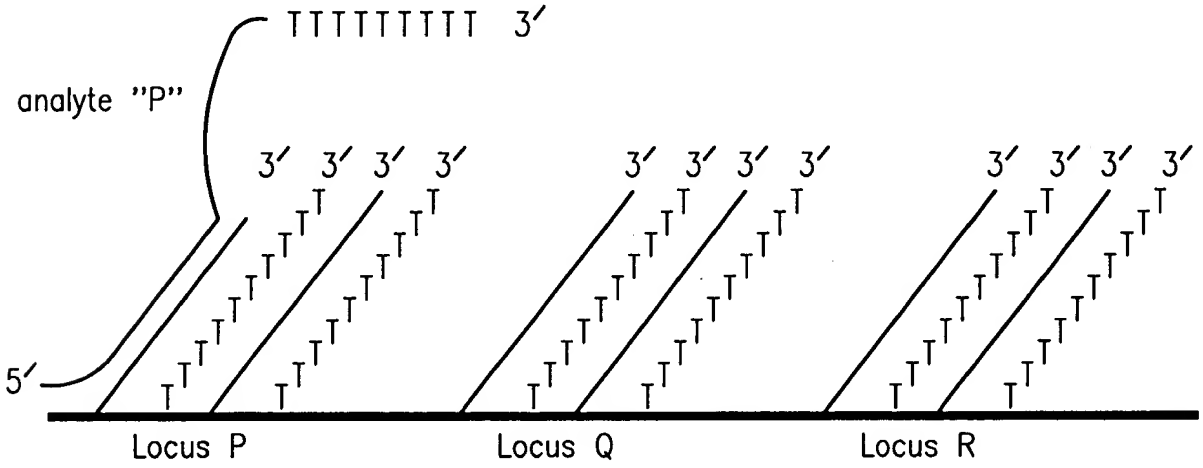


FIG. 16

Binding of an analyte to an array with SPE's and UPE's

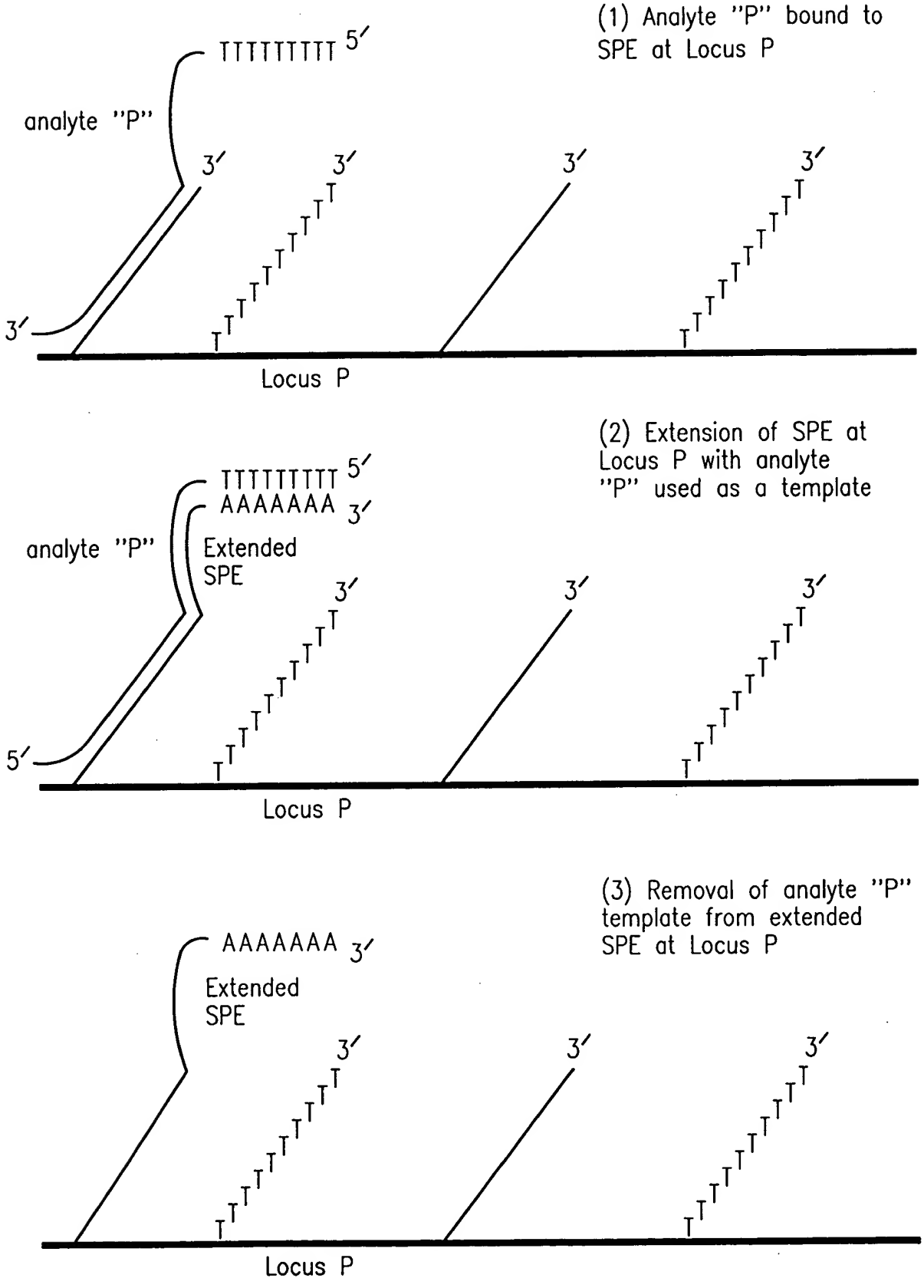
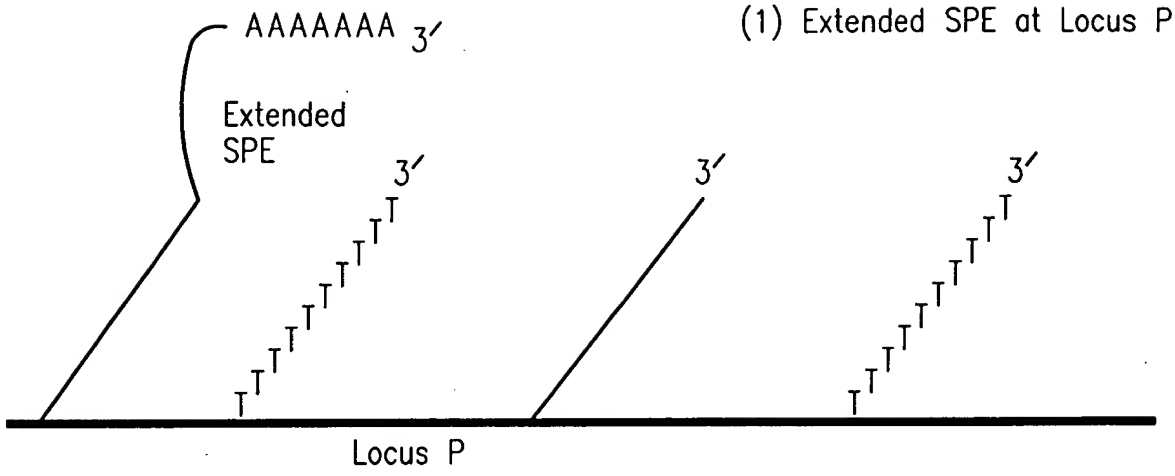
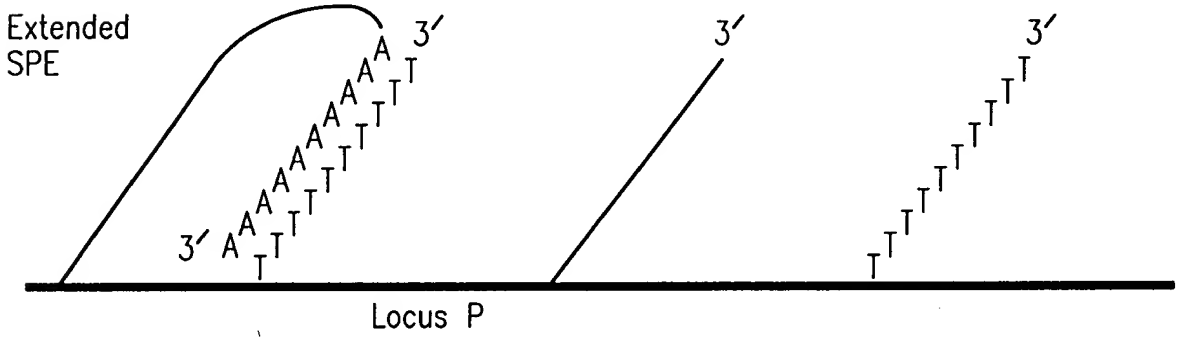


FIG. 17

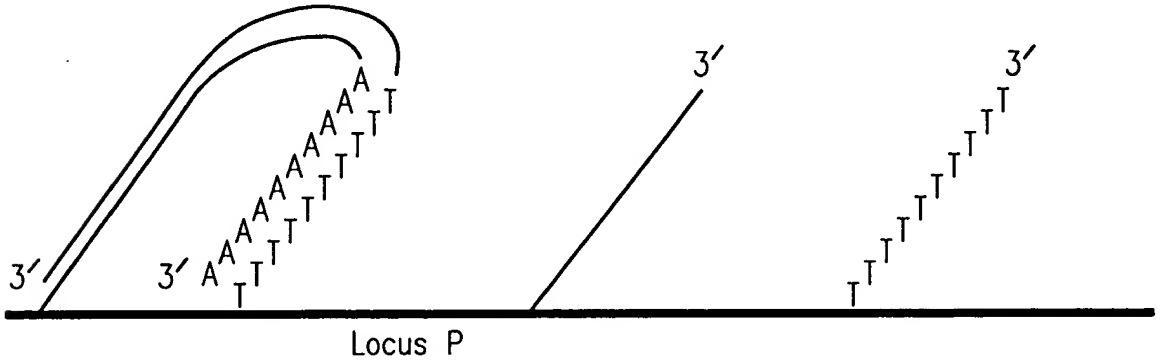
Extension of an SPE



(1) Extended SPE at Locus P



(2) Binding of 3′ end of extended SPE to UPE at Locus P



(3) Extension fo 3′ end of UPE at Locus P using the extended SPE as a template

FIG. 18

Binding of a UPE to an extended SPE followed by extension of the UPE

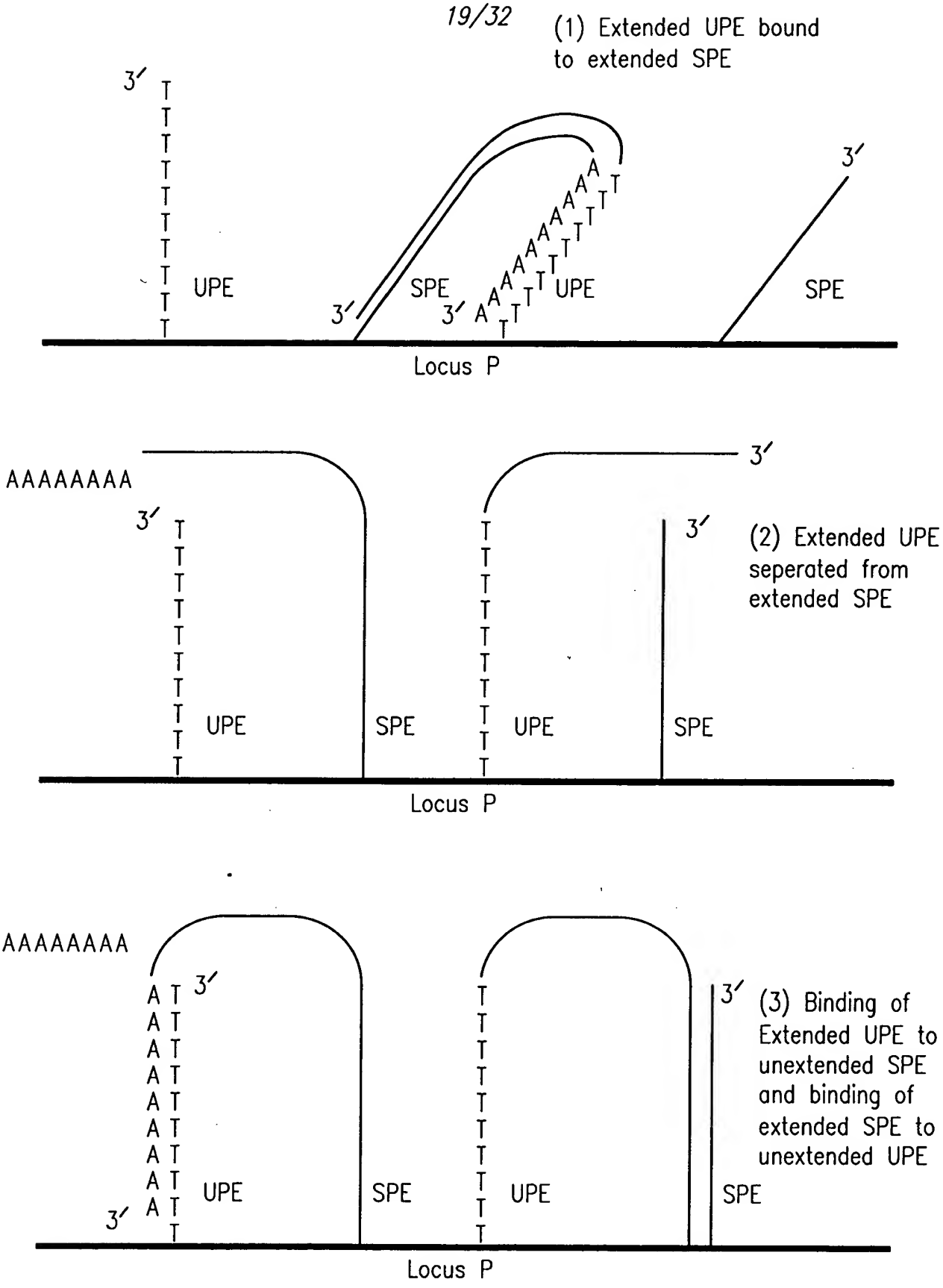


FIG. 19

Binding of extended SPE's and UPE's to un-extended SPE's and UPE's

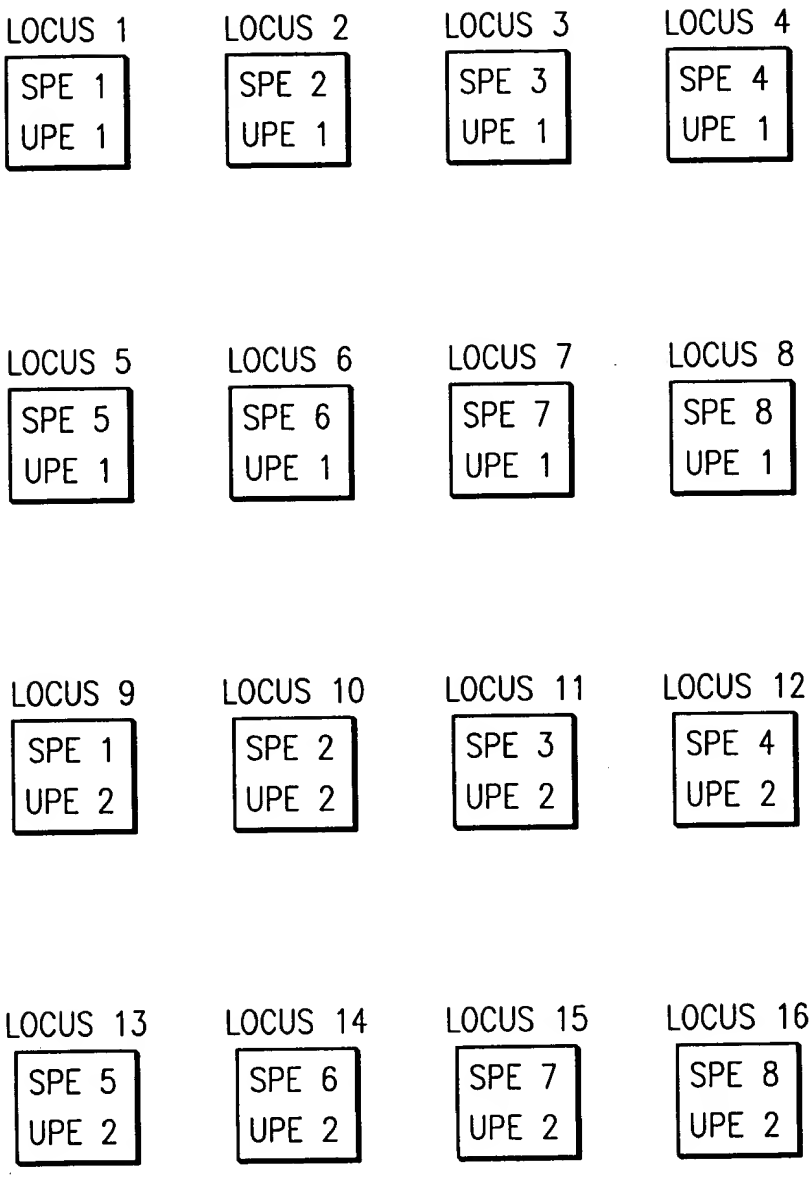
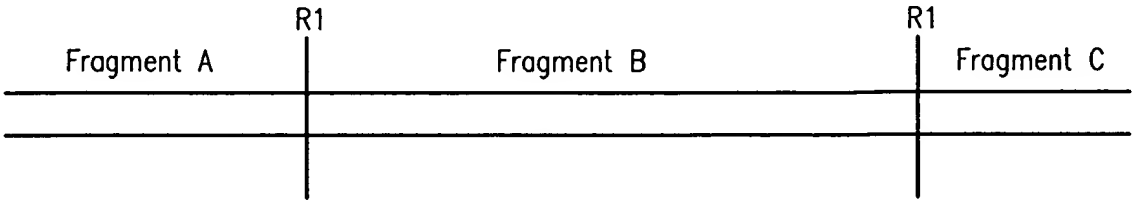


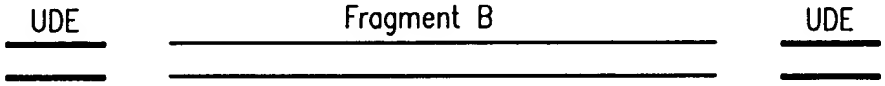
FIG. 20

Amplification Array for Comparative Analysis

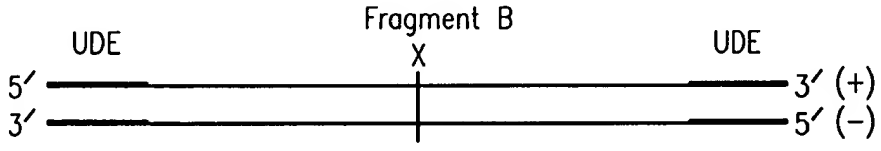
(1) Digestion of DNA with restriction enzyme R1



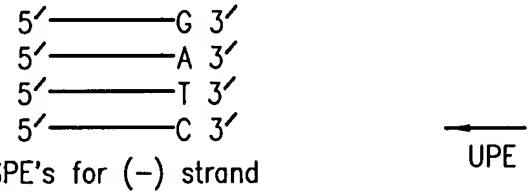
(2) Ligation of UDE's to DNA fragments

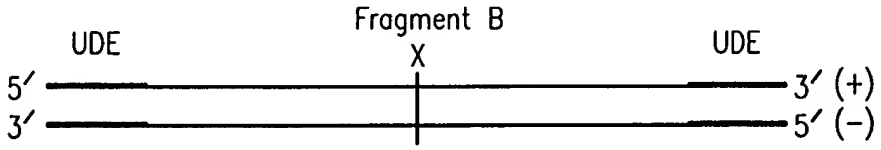


(3) Binding and extension of SPE primers with different 3′ ends followed by extensions with UPE primers



(−)strand as template





(+)strand as template

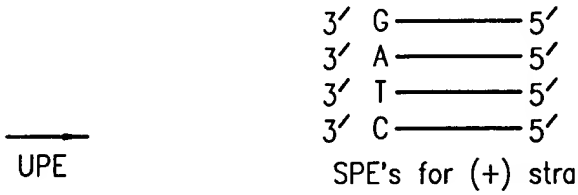


FIG. 21

Use of an array with SPE's and UPE's for SNP analysis

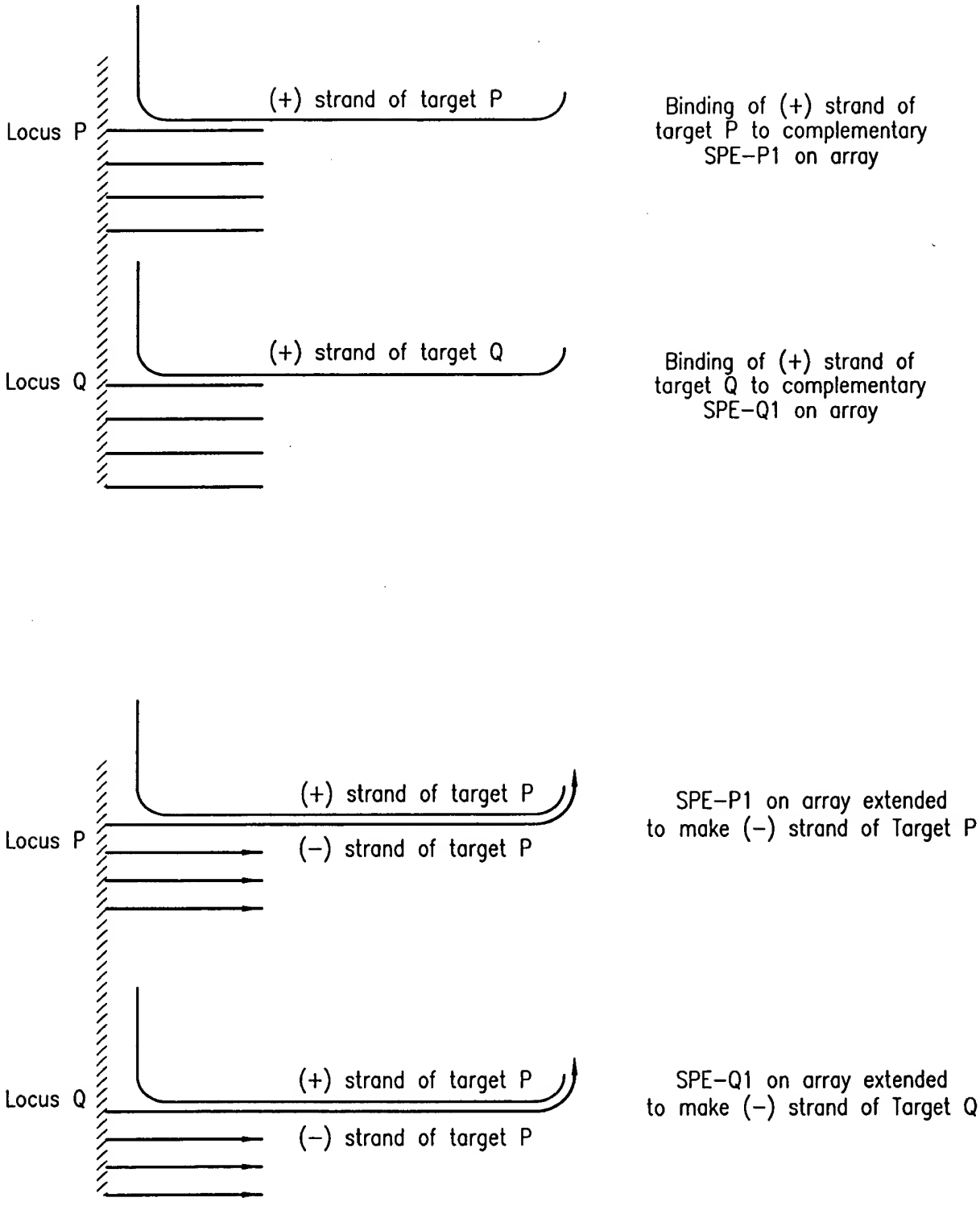

(+) strand of target P
Locus P
Binding of (+) strand of target P to complementary SPE–P1 on array
(+) strand of target Q
Locus Q
Binding of (+) strand of target Q to complementary SPE–Q1 on array
(+) strand of target P
(–) strand of target P
Locus P
SPE–P1 on array extended to make (–) strand of Target P
(+) strand of target P
(–) strand of target P
Locus Q
SPE–Q1 on array extended to make (–) strand of Target Q

FIG. 22

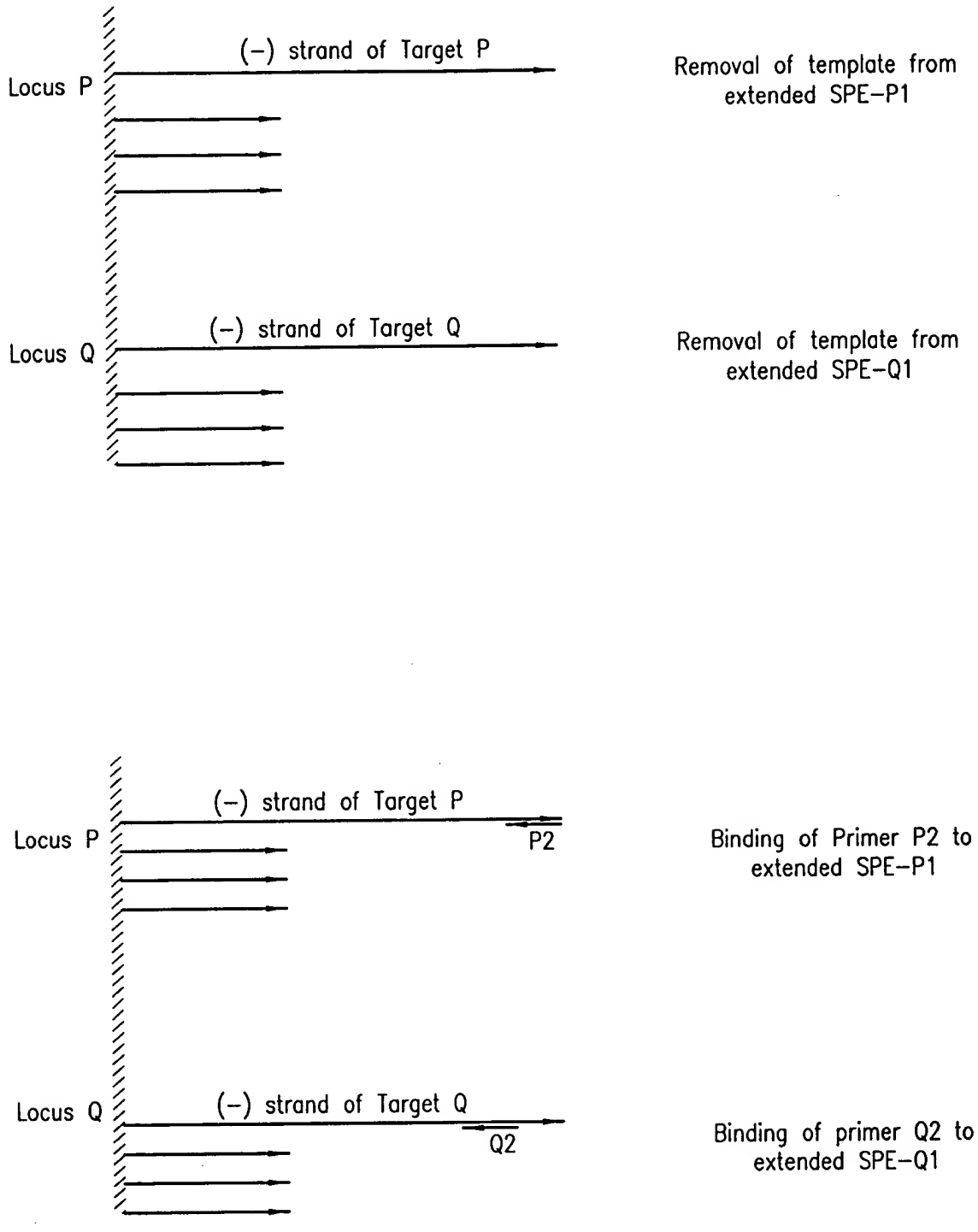
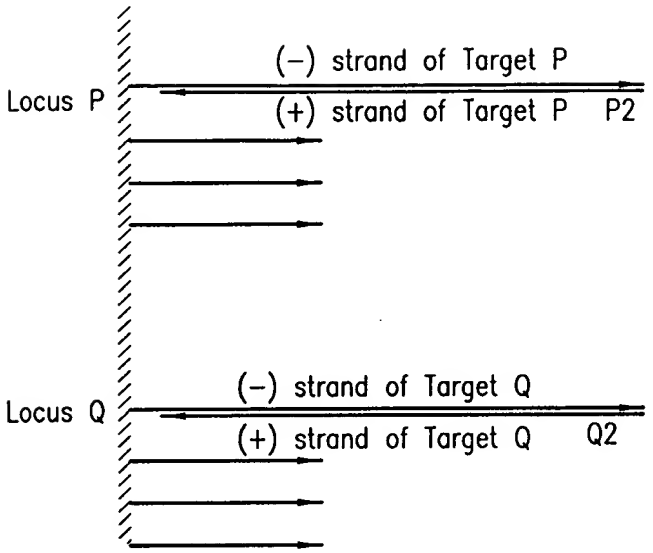
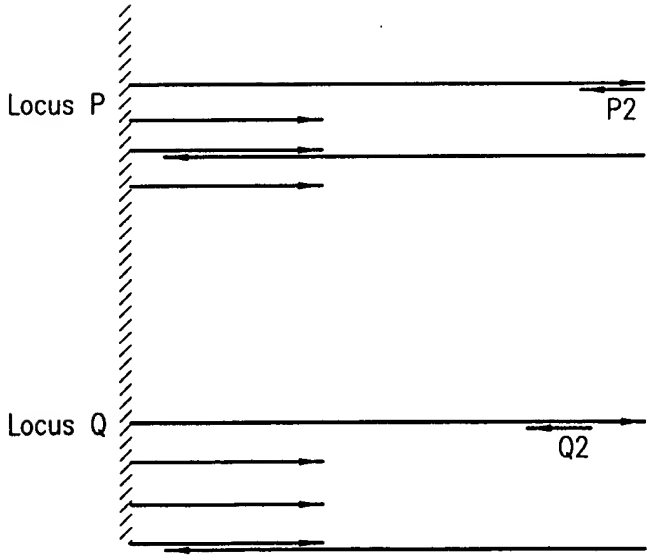

(−) strand of Target P
Locus P
Removal of template from extended SPE−P1
(−) strand of Target Q
Locus Q
Removal of template from extended SPE−Q1
(−) strand of Target P
P2
Locus P
Binding of Primer P2 to extended SPE−P1
(−) strand of Target Q
Q2
Locus Q
Binding of primer Q2 to extended SPE−Q1

FIG. 23



Extension of primer P2 by using extended SPE−P1 as a template

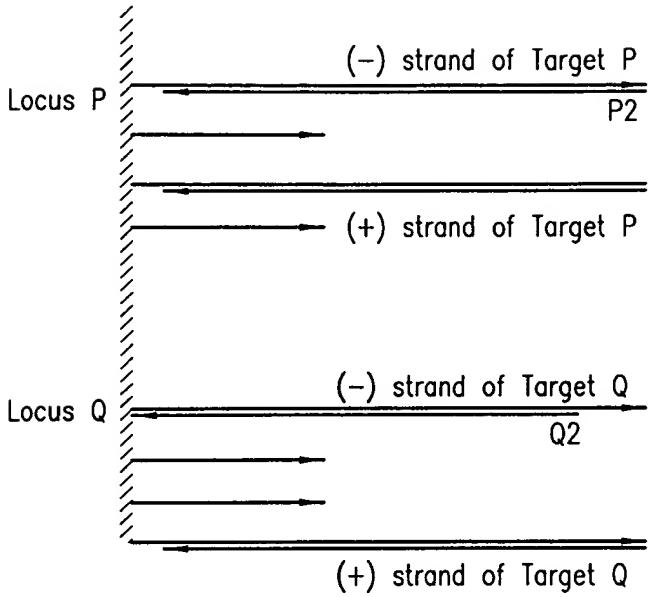
Extension of primer Q2 by using extended SPE−Q1 as a template



Denaturation followed by annealing of primer P2 to extended SPE−P1 and hybridization of extended P2 to un−extended SPE−P1

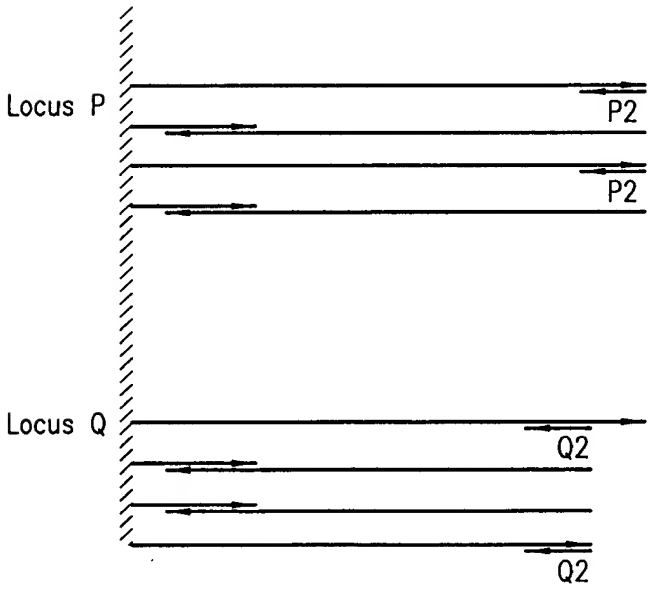
Denaturation followed by annealing of primer Q2 to extended SPE−Q1 and hybridization of extended Q2 to un−extended SPE−Q1

FIG. 24



Extension of primer P2 and SPE−P1

Extension of primer Q2 and SPE−Q1



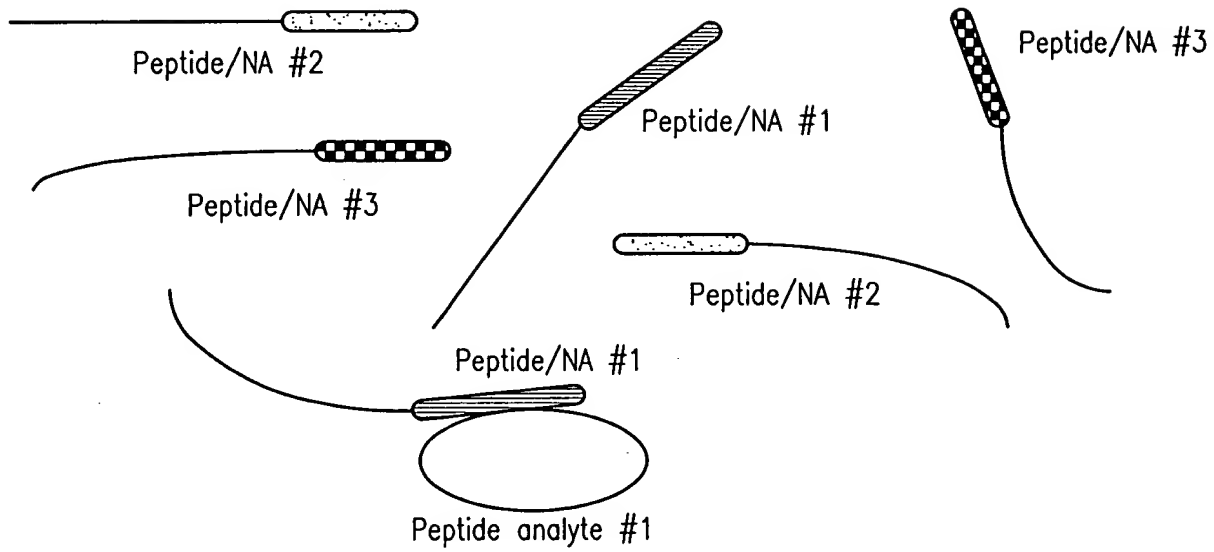
Denaturation followed by annealing of primer P2's to extended SPE−P1's and hybridization of extended P2's to un−extended SPE−P1's

Denaturation followed by annealing of primer Q2's to extended SPE−Q1's and hybridization of extended Q2's to un−extended SPE−Q1's

FIG. 25

A) Mixture of Library of Peptide analytes with a Library of Peptide/NAs

B) Binding of Peptide analyte #1 to Peptide/NA #1



C) Binding of Peptide/NAs to matrix through complementary sequences

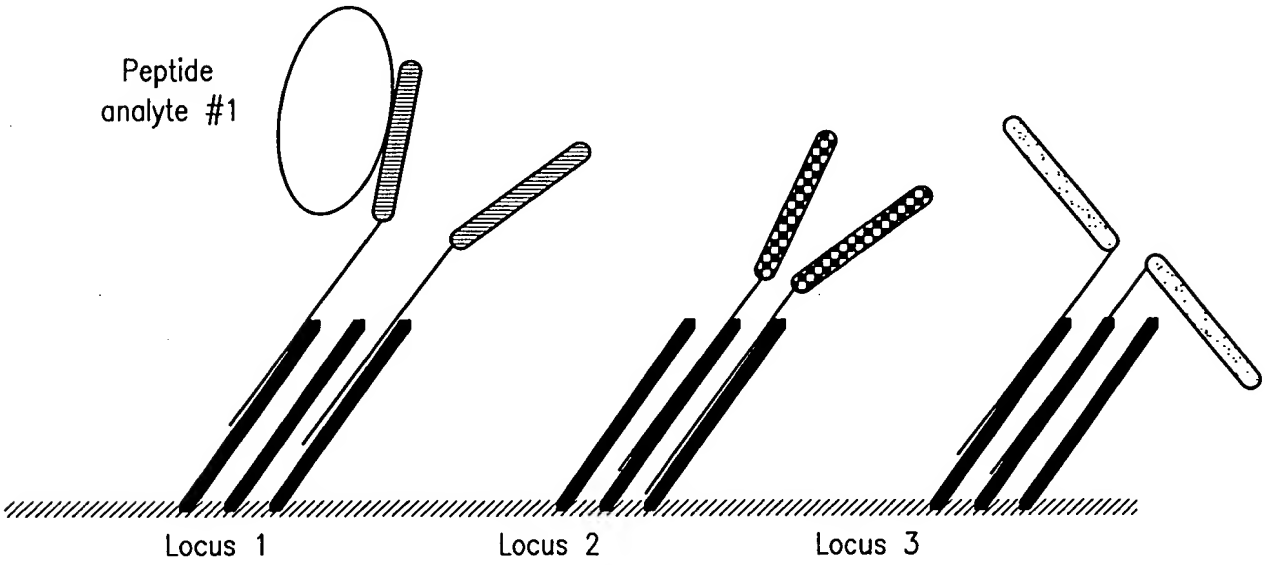
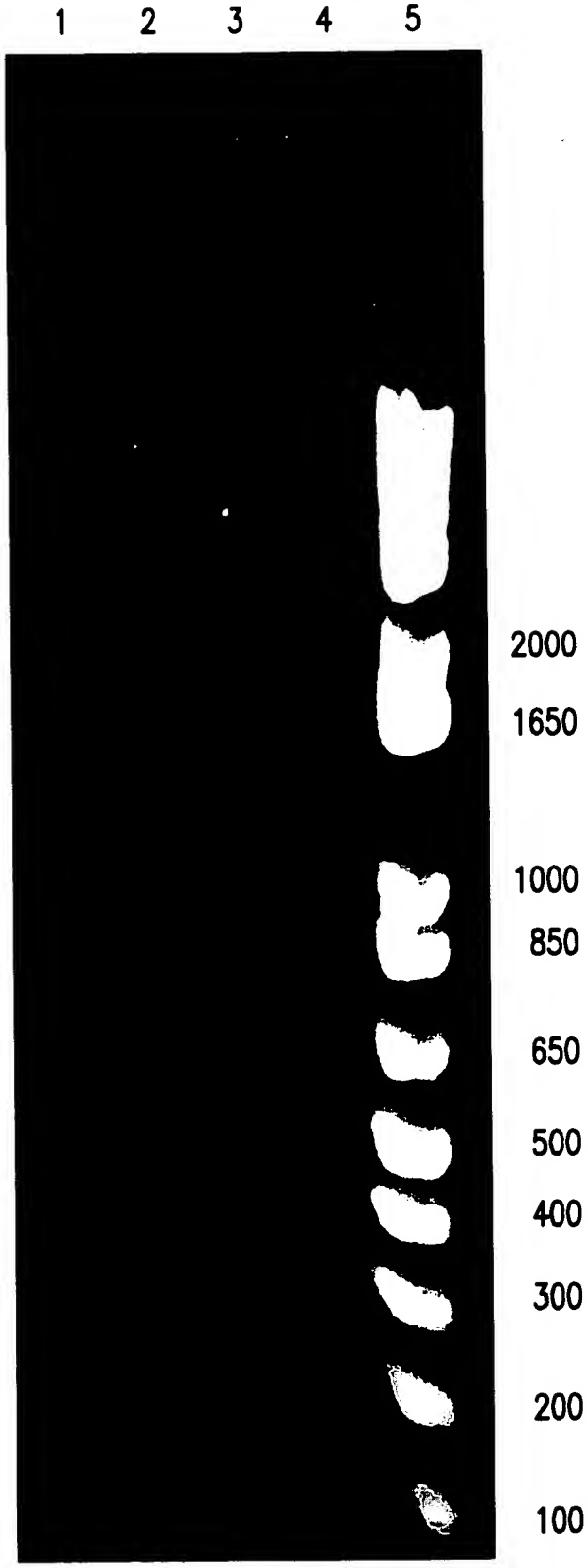
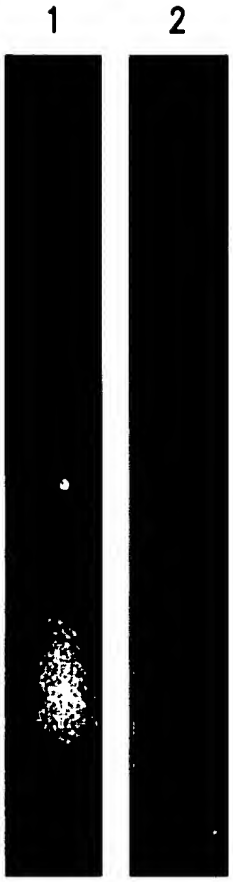


FIG. 26



1. "+" RT
2. "+" RT
3. "−" RT
4. "−" RT
5. 1 kb PLUS DNA Ladder

FIG. 27

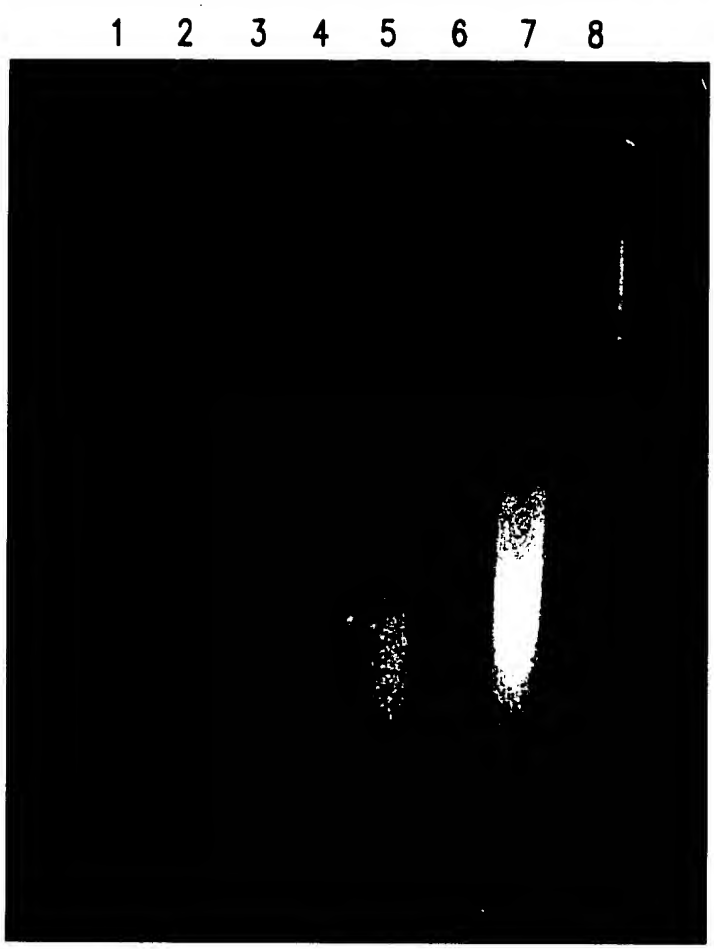


1. Transcription product
2. 1kb PLUS DNA ladder

FIG. 28

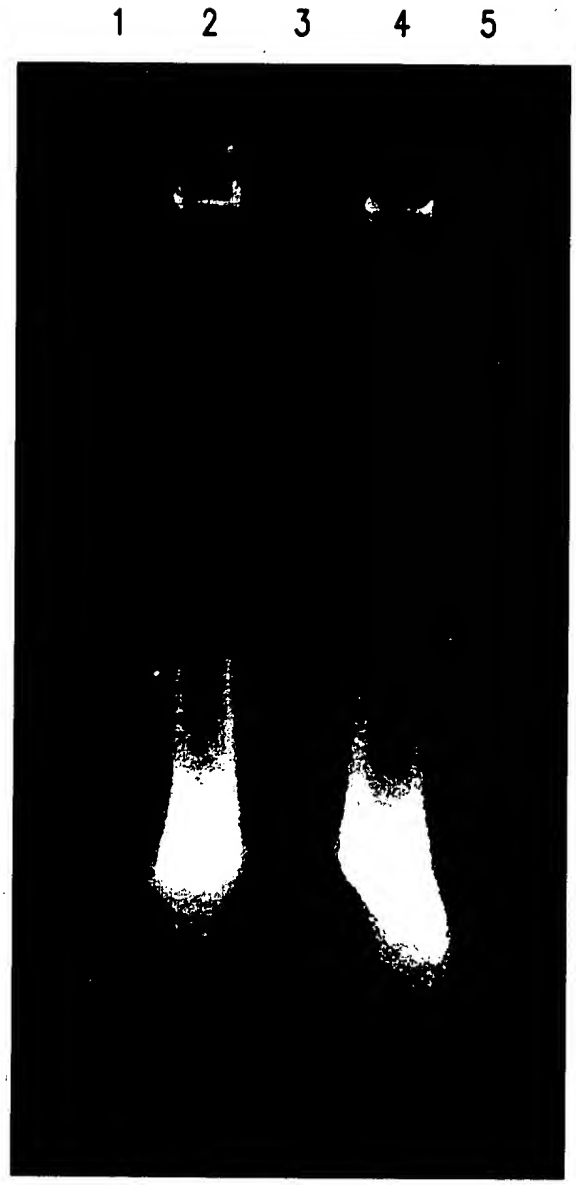
1. Transcription product
2. 1kb PLUS DNA ladder

FIG. 29



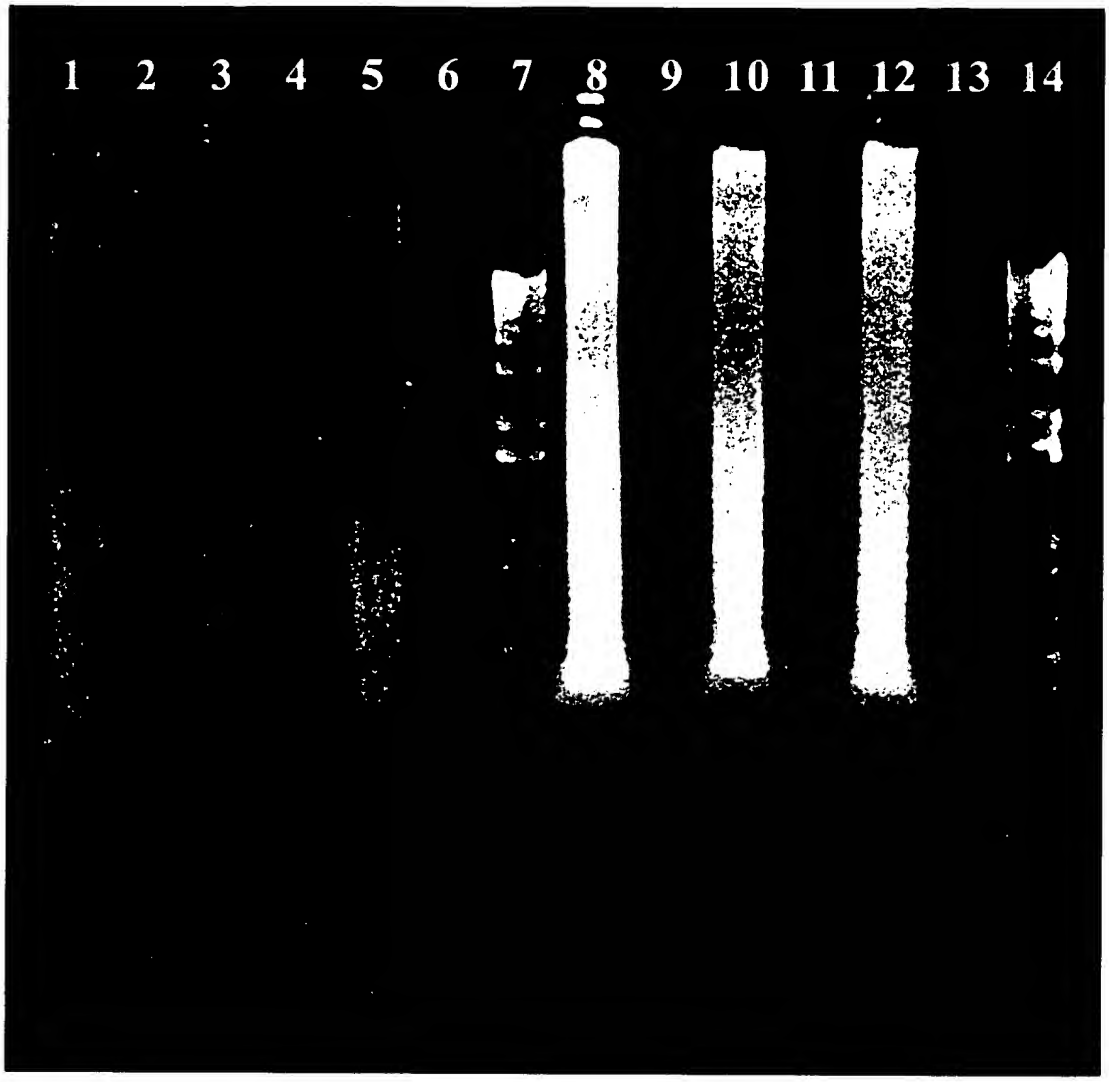
1. Random primers −2 μl
2. T7−C9 primers without TdT tailing −2 μl
3. T7−C9 primers after TdT tailing −2 μl
4. 1 kb PLUS DNA Ladder
5. Random primers −10 μl
6. T7−C9 primers without TdT tailing −10 μl
7. T7−C9 primers after TdT tailing −10 μl
8. 1 kb PLUS DNA Ladder

FIG. 30



1. Taq pol. 1 cycle
2. Taq pol. 5 cycles
3. Tth pol. 1 cycle
4. Tth pol. 5 cycles
5. 1 kb PLUS DNA Ladder

FIG. 31



1. SAMPLE 1–4 μl TRANSCRIPTION PRODUCT
2. SAMPLE 1–1 μl DNA TEMPLATE
3. SAMPLE 2–4 μl TRANSCRIPTION PRODUCT
4. SAMPLE 2–1 μl DNA TEMPLATE
5. SAMPLE 3–4 μl TRANSCRIPTION PRODUCT
6. SAMPLE 3–1 μl DNA TEMPLATE
7. 1 kb PLUS DNA LADDER
8. SAMPLE 1–10 μl TRANSCRIPTION PRODUCT
9. SAMPLE 1–2.5 μl DNA TEMPLATE
10. SAMPLE 2–10 μl TRANSCRIPTION PRODUCT
11. SAMPLE 2–2.5 μl DNA TEMPLATE
12. SAMPLE 3–10 μl TRANSCRIPTION PRODUCT
13. SAMPLE 3–2.5 μl DNA TEMPLATE
14. 1 kb PLUS DNA LADDER

FIG. 32

1. 1 kb PLUS DNA LADDER
2. - - - -
3. SUPERSCRIPT II (LIFE TECHNOLOGIES)
4. M-MuLV (LIFE TECHNOLOGIES)
5. M-MuMuLV (NEW ENGLAND BIOLABS)
6. ENHANCED AMV (SIGMA)
7. AMV (LIFE TECHNOLOGIES)
8. AMV (SIGMA)
9. OMNISCRIPT (QIAGEN)
10. DISPLAY THERMO-RT (DISPLAY SYSTEMS BIOTECH)
11. POWERSCRIPT (CLONTECH)
12. - - - -
13. λ - HIND 111 MARKER

FIG 33